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EXAMINER	
BONANTO, GEORGE P	

ART UNIT	PAPER NUMBER
2855	

DATE MAILED: 07/26/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Sn

Office Action Summary	Application No.	Applicant(s)	
	10/804,935	SCHUMACHER, MARK	
	Examiner	Art Unit	
	George P. Bonanto	2855	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-33 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-33 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *18 March 2004* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____.

DETAILED ACTION

Drawings

The drawings are objected to because reference numeral 108 in Fig. 1 is not described in the specification. It appears that reference numeral 108 should be replaced with reference numeral 14 in Fig. 1. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

The disclosure is objected to because of the following informalities: in the description of Fig. 1, at page 6 line 28, reference numeral 10 is described as the "capacitive differential flow sensor. The specification goes on to refer to reference numeral 10 in various ways, including:

"flow sensor," "sensor element," "differential pressure sensor" and "sensor." A single description should be used for each reference numeral. Appropriate correction is required.

Claim Objections

Claim 8 is objected to because of the following informalities: claim 8, page 28 lines 22-23, contains the phrase, "based on electrical capacitance." The claim phrase should be deleted and the phrase, "based on the electrical capacitance" should be inserted in its place. Appropriate correction is required.

Claim 9 is objected to because of the following informalities: claim 9, page 28 lines 27-29, contains the phrase, "mounted to the housing and electrically connected with the annular capacitor." The claim element "housing" lacks antecedent basis. Furthermore, the claim element "annular capacitor" lacks antecedent basis.

In addition, claim 9, page 29 line 2, contains the phrase, "and/or." The phrase "and/or" is indefinite. Appropriate correction is required.

Claim 10 is objected to because of the following informalities: claim 10, page 29 lines 15-17, includes the phrase, "partially over the electrode and that is configured to move relative to the electrode." The claim element "the electrode" lacks antecedent basis. The claim element "the electrode" should be deleted and the claim element "the second electrode" inserted in its place. Appropriate correction is required.

In addition, claim 10, page 29 lines 19-24, contains the phrase, "the flow restrictive element is positioned between the first capacitor and the second capacitor to measure a first capacitance and a second capacitance." This phrase is confusing because the flow restrictive

element is not positioned to measure. It should be made clear what is the function of each element.

Claim 12 is objected to because of the following informalities: claim 12, page 30 lines 6-7, includes the claim element "the fluid flow conduit," which lacks antecedent basis. The claim element "the fluid flow conduit" should be deleted and the claim element "the vessel" inserted in its place. Appropriate correction is required.

Claim 13 is objected to because of the following informalities: claim 13, page 30 lines 28-29, contains the claim element "the pressure," which lacks antecedent basis. The claim element "the pressure" should be deleted and the claim element "the differential pressure" inserted in its place.

In addition, claim 13, page 30 line 27, contains the phrase, "wherein in a first capacitance." The word "in" should be deleted. Appropriate correction is required.

Claim 15 is objected to because of the following informalities: claim 15, page 31 lines 20-23, contains the phrase, "wherein an electrical capacitance between the electrode and the diaphragm is related to the pressure of the process fluid." It is unclear between which electrode and which diaphragm there is a capacitance. Claim 15 should include a precise recitation of the structure and function of each element of the invention claimed. Appropriate correction is required.

Claim 18 is objected to because of the following informalities: claim 18, page 32 line 12, contains the claim element "the flow rate signal, " which lacks antecedent basis. The claim element "flow rate signal" is introduced in claim 14. Claim 18, however does not depend from claim 14. Appropriate correction is required.

Claim 23 is objected to because of the following informalities: claim 23, page 34 lines 8-11, contains the phrase, "the diaphragm is flush with the inner wall of the fluid flow conduit and the electrode is recessed into the wall." The claim element "fluid flow conduit" lacks antecedent basis and should be deleted and the claim element "conduit" inserted in its place. Furthermore, the claim element "the wall" lacks antecedent basis and should be deleted and the claim element "inner wall" inserted in its place. Appropriate correction is required.

Claim 27 is objected to because of the following informalities: claim 27, page 34 line 28, contains the claim element "the wall," which lacks antecedent basis. Appropriate correction is required.

Claim 31 is objected to because of the following informalities: claim 20 includes the claim element "electrical capacitance" which lacks antecedent basis. Furthermore, the claim element "electrical capacitance" is confusing because there are two capacitors. Appropriate correction is required.

Claim 32 is objected to because of the following informalities: claim 32, page 36 line 2, contains the phrase, "and/or." The phrase, "and/or" is indefinite.. Appropriate correction is required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an

> international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-3, 6-8, 11 and 12 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Pat. No. 4,484,479 to Eckhardt.

As to claim 1, Eckhardt discloses a pressure sensor for measuring a pressure of a process fluid comprising a vessel for receiving the process fluid (cylindrical casing 12, Fig. 1) an electrode integral with an inner wall of the vessel (electrode 14, Fig. 1) and a diaphragm that extends at least partially over the electrode and that is configured to move relative to the electrode in response to the pressure of the process fluid (membrane 24, Fig. 1 and col. 2 lines 16-24) wherein an electrical capacitance between the electrode and the diaphragm is related to the pressure of the process fluid (col. 2 lines 15-24).

As to claim 2, Eckhardt further discloses that the electrode extends partially around the inner wall of the vessel (tubular form, abstract, and electrode 14 existing both above and below membrane 24 with indications that electrode 14 is continuous, Fig. 1).

As to claim 3, Eckardt further discloses that the diaphragm extends partially around the inner wall of the vessel (membrane is in tubular form, col. 1 lines 14-15).

As to claim 6, Eckhardt further discloses that the electrode extends completely around the inner wall of the vessel (tubular form, abstract and electrode 14 existing both above and below membrane 24 with indications that electrode 14 is continuous, Fig. 1).

As to claim 7, Eckardt further discloses that the diaphragm extends completely around the inner wall of the vessel (membrane is in tubular form, col. 1 lines 14-15).

As to claim 8, Eckhardt further discloses a measurement circuit adapted to produce a pressure signal based on the electrical capacitance (capacitance measuring circuit C, Fig. 1 and col. 1 lines 25-32 and col. 1 line 67 to col. 2 line 6).

As to claim 11, Eckhardt further discloses that the diaphragm extends away from the inner wall into the process fluid (membrane 24 curves out from casing 12 into path of flow F, Fig. 1).

As to claim 12, Eckhardt further discloses that the diaphragm is flush with the inner wall of the vessel and the electrode is recessed into the inner wall (membrane 126 acts as inner wall of conduit, membrane is flush with inner wall electrode 114 is recessed into the wall, Fig. 2).

Claims 1, 4, 5, 10, 13-19, 21, 22, 25-28 and 31 are rejected under 35 U.S.C. 102(e) as being anticipated by U.S. Pat. No. 6,725,731 to Wiklund et al.

As to claim 1, Wiklund discloses a pressure sensor for measuring a pressure of a process fluid comprising a vessel for receiving the process fluid (pipe 12, Fig. 2) and electrode integral with the inner wall of the vessel and a diaphragm that extends at least partially over the electrode and that is configured to move relative to the electrode in response to the pressure of the process fluid (capacitance-based differential pressure sensor, col. 4 lines 9-14, integral with restriction member which is part of the vessel wall, Fig. 10) wherein an electrical capacitance between the electrode and the diaphragm is related to the pressure of the process fluid (col. 4, lines 9-14).

As to claim 4, Wiklund et al. further disclose a temperature sensor integral with the inner wall to measure a fluid temperature and to generate a temperature signal indicative of the fluid temperature (col. 5, lines 41-49).

As to claim 5, Wiklund et al. further disclose processing electronics adapted to produce a pressure signal that is a function of the temperature signal (col. 5, lines 60-63).

As to claim 10, Wiklund et al. further disclose that the electrode and the diaphragm form a first capacitor (capacitance-based pressure sensor 102A, Fig. 10) a flow restrictive element extending from the inner wall of the vessel into the process fluid (restrictive member 20, Figs 2 and 10) a second capacitor having a second electrode ad a second diaphragm that extends at least partially over the second electrode and that is configured to move relative to the second electrode in response to the pressure of the process fluid (capacitance-based pressure sensor 102B) wherein the flow restrictive element is positioned between the first capacitor and the second capacitor (restrictive member 20, Fig. 10) to measure a first capacitance and a second capacitance such that a difference between the first and second capacitances is a differential capacitance representative of a differential pressure of the process fluid (col. 6, lines 57-65).

As to claim 13, Wiklund et al. disclose a differential pressure sensor for measuring a differential pressure of a process fluid in a conduit comprising a flow restriction element integral with an inner wall of the conduit adapted to produce a pressure drop when placed in-line with a fluid flow (restrictive member 20, Fig. 10, integral with inner wall of pipe 12, Fig. 2) a first capacitor integral with the inner wall of the conduit and positioned upstream from the flow restriction element and in-line with the process fluid (capacitance-based pressure sensor 102A, the conduit being the pipe 12 and the restrictive member 20) a second capacitor integral with the inner wall of the conduit and positioned downstream from the flow restriction element and in-line with the process fluid (capacitance-based pressure sensor 102B, the conduit being the pipe

12 and the restrictive member 20) wherein a first capacitance and a second capacitance are related to a pressure of the process fluid (col. 6, lines 57-65).

As to claim 14, Wiklund further discloses processing electronics adapted to produce a flow rate signal that is indicative of a direction and a flow rate of the process fluid as a function of the first and second capacitances (col. 2, lines 31-37).

As to claim 15; Wiklund et al. further disclose that the first capacitor and the second capacitor each comprise an electrode integral with an inner wall of the conduit and a diaphragm that extends at least partially over the electrode and that is configured to move relative to the electrode in response to the pressure of the process fluid (capacitance-based pressure sensors 102A and B integral with inner wall of the conduit, Fig. 10) wherein an electrical capacitance between the electrode and the diaphragm is related to the pressure of the process fluid (col. 4, lines 11-14).

As to claim 16, Wiklund et al. further disclose that the flow restriction element has a narrow fluid flow passageway extending between symmetric first and second throat portions (Figs. 3B and 3C).

As to claim 17, Wiklud et al. further disclose a temperature sensor adapted to sense at least one of a temperature of the fluid flow and an operating temperature of the pressure sensor and to produce a temperature signal that is indicative of the sensed temperature (col. 5, lines 41-49).

As to claim 18, Wiklund et al. further disclose that the flow rate signal is further a function of the temperature signal (col. 5, lines 60-63).

As to claim 19, Wiklund et al. further disclose that the first capacitor and the second capacitor extend at least partially around the inner wall of the conduit (conduit being the pipe 12 and the restrictive member 20, Fig. 10 and the capacitance-based pressure sensors 102A and B covering at least a part of the restrictive member 20, Figs. 2 and 10).

As to claim 21, Wiklund et al. disclose a flow meter adapted to measure a pressure and a flow direction of a process fluid within a conduit the flow meter comprising a first capacitive pressure sensor adapted to generate a first capacitance signal (capacitance-based pressure sensor 102A, Fig. 10) a second capacitive pressure sensor adapted to generate a second capacitance signal (capacitance-based pressure sensor 102B, Fig. 10) and a flow restrictive element positioned within the conduit and between the first and the second capacitive pressure sensors and adapted to cause a pressure drop in the conduit (restrictive member 20, Fig. 10 and col. 3, lines 18-21) wherein the first and the second capacitance signals are representative of a first and a second pressure of the process fluid such that the first and the second capacitance signals may be subtracted to calculate a differential capacitance representative of a differential pressure (col. 6, lines 57-61).

As to claim 22, Wiklund et al. further disclose that each capacitive pressure sensor comprises an electrode integral to an inner wall of the conduit and a diaphragm that extends at least partially over the electrode and that is configured to move relative to the electrode in response to the pressure of the process fluid (capacitance-based pressure sensors 102A and B, Fig. 10, integral with the inner wall of the conduit) wherein an electrical capacitance between the electrode and the diaphragm is related to the pressure of the process fluid (col. 2, lines 32-37 and col. 6, lines 57-61).

As to claim 25, Wiklund et al. further disclose that the electrode extends at least partially around the inner wall of the conduit (Fig. 2).

As to claim 26, Wiklund et al. further disclose that the diaphragm extends at least partially around the inner wall of the conduit (Fig. 2).

As to claim 27, Wiklund et al. further disclose a temperature sensor integral with the wall (temperature sensor 58, Fig. 6) to measure a fluid temperature and to generate a temperature signal indicative of the fluid temperature (col. 5, lines 41-49).

As to claim 28, Wiklund et al. further disclose processing electronics adapted to produce a pressure signal that is a function of the temperature signal (col. 5, lines 57-60).

As to claim 31, Wiklund et al. further disclose a measurement circuit adapted to produce a pressure signal based on the electrical capacitance (col. 4, lines 15-16).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Pat. No. 4,484,479 to Eckhardt in view of Published U.S. Application No. 2005/0145018 by Sabata et al.

Eckhardt discloses a pressure sensor for measuring a pressure of a process fluid comprising a vessel for receiving the process fluid (cylindrical casing 12, Fig. 1) an electrode integral with an inner wall of the vessel (electrode 14, Fig. 1) and a diaphragm that extends at

least partially over the electrode and that is configured to move relative to the electrode in response to the pressure of the process fluid (membrane 24, Fig. 1 and col. 2 lines 16-24) wherein an electrical capacitance between the electrode and the diaphragm is related to the pressure of the process fluid (col. 2 lines 15-24). Eckhardt fails, however, to disclose a wireless transceiver for transmitting the pressure signal to a control system.

Sabata et al. disclose a wireless transceiver (paragraph 26) mounted to the inner wall of a vessel (paragraph 26 and Fig. 1) for the wireless transmission of a pressure signal to a control system (paragraph 25 and abstract).

It would have been obvious to one of ordinary skill in the art to include the wireless transceiver of Sabata et al. in the pressure sensor of Eckhardt in order to enable remote monitoring of the pressure in the pipe, which may be very long or inaccessible, such as buried for example, because the pressure signal may indicate a leak in the vessel (paragraph 25).

Claims 20, 23, 24, 29 and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Pat. No. 6,725,731 to Wiklund et al. in view of U.S. Pat. No. 4,484,479 to Eckhardt.

As to claim 20, Wiklund et al. disclose a differential pressure sensor for measuring a differential pressure of a process fluid in a conduit comprising a flow restriction element integral with an inner wall of the conduit adapted to produce a pressure drop when placed in-line with a fluid flow (restrictive member 20, Fig. 10, integral with inner wall of pipe 12, Fig. 2) a first capacitor integral with the inner wall of the conduit and positioned upstream from the flow restriction element and in-line with the process fluid (capacitance-based pressure sensor 102A, the conduit being the pipe 12 and the restrictive member 20) a second capacitor integral with the inner wall of the conduit and positioned downstream from the flow restriction element and in-

line with the process fluid (capacitance-based pressure sensor 102B, the conduit being the pipe 12 and the restrictive member 20) wherein a first capacitance and a second capacitance are related to a pressure of the process fluid (col. 6, lines 57-65). Wiklund et al. fail, however, to disclose that each of the first capacitor and the second capacitor extend entirely around the inner wall of the conduit.

Eckhardt discloses a capacitor that extends entirely around an inner wall of a conduit (tubular form, abstract, and electrode 14 existing both above and below membrane 24 with indications that electrode 14 is continuous, Fig. 1).

It would have been obvious to one of ordinary skill in the art to use the tubular capacitor of Eckhardt in the place of the first and second capacitors of Wiklund in order to obtain a pressure signal that is representative of the pressure throughout the conduit, thereby reducing the chance that the pressure signal is inaccurate due to local flow disturbances.

As to claim 23, Wiklund et al. disclose a flow meter adapted to measure a pressure and a flow direction of a process fluid within a conduit the flow meter comprising a first capacitive pressure sensor adapted to generate a first capacitance signal (capacitance-based pressure sensor 102A, Fig. 10) a second capacitive pressure sensor adapted to generate a second capacitance signal (capacitance-based pressure sensor 102B, Fig. 10) and a flow restrictive element positioned within the conduit and between the first and the second capacitive pressure sensors and adapted to cause a pressure drop in the conduit (restrictive member 20, Fig. 10 and col. 3, lines 18-21) wherein the first and the second capacitance signals are representative of a first and a second pressure of the process fluid such that the first and the second capacitance signals may be subtracted to calculate a differential capacitance representative of a differential pressure (col.

6, lines 57-61). Wiklund et al. fail, however, to disclose that the diaphragm is flush with the inner wall of the conduit and the electrode is recessed into the wall.

Eckhardt discloses that the diaphragm is flush with the inner wall of the conduit and the electrode is recessed into the wall (membrane 126 acts as inner wall of conduit, membrane is flush with inner wall electrode 114 is recessed into the wall, Fig. 2).

It would have been obvious to one of ordinary skill in the art to replace the capacitive pressure sensor of Wiklund et al. with the capacitive sensor of Eckhardt for use in applications where the fluid may contain debris in order reduce the chance that the debris in the fluid flow will strike the diaphragm and break the sensor.

As to claim 24, Wiklund et al. further disclose that each capacitive pressure sensor comprises an electrode integral to an inner wall of the conduit and a diaphragm that extends at least partially over the electrode and that is configured to move relative to the electrode in response to the pressure of the process fluid (capacitance-based pressure sensors 102A and B, Fig. 10, integral with the inner wall of the conduit) wherein an electrical capacitance between the electrode and the diaphragm is related to the pressure of the process fluid (col. 2, lines 32-37 and col. 6, lines 57-61). Wiklund et al, fail, however, to disclose that the diaphragm extends into the process fluid and the electrode is flush with the inner wall of the conduit.

Eckhardt discloses that the diaphragm extends into the process fluid and the electrode is flush with the inner wall of the conduit (curved membrane 24, and flush electrodes 14 and 16, Fig. 1).

It would have been obvious to one of ordinary skill in the art to replace the capacitive sensor of Wiklund et al. with the capacitive sensor of Eckhardt in order to eliminate the need for

an additional flow restrictive element because the diaphragm extending into the process flow serves as a restrictive element.

As to claim 29 and 30, Wiklund et al. fail to disclose that the electrode and the diaphragm extend completely around the inner wall of the conduit.

Eckhardt discloses that the electrode and the diaphragm extend entirely around the inner wall of the conduit (tubular form membrane, col. 1 line 14, and electrode 14 existing both above and below membrane 24 with indications that electrode 14 is continuous, Fig. 1).

It would have been obvious to one of ordinary skill in the art to use the tubular capacitor, with the tubular electrode and tubular diaphragm, of Eckhardt in the flow meter of Wiklund et al. order to obtain a pressure signal that is representative of the pressure throughout the conduit, thereby reducing the chance that the pressure signal is inaccurate due to local flow disturbances.

Claim 32 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Pat. No. 6,725,731 to Wiklund et al. in view of Published U.S. Application No. 2005/0145018 by Sabata et al.

Wiklund et al. disclose a flow meter adapted to measure a pressure and a flow direction of a process fluid within a conduit the flow meter comprising a first capacitive pressure sensor adapted to generate a first capacitance signal (capacitance-based pressure sensor 102A, Fig. 10) a second capacitive pressure sensor adapted to generate a second capacitance signal (capacitance-based pressure sensor 102B, Fig. 10) and a flow restrictive element positioned within the conduit and between the first and the second capacitive pressure sensors and adapted to cause a pressure drop in the conduit (restrictive member 20, Fig. 10 and col. 3, lines 18-21) wherein the first and the second capacitance signals are representative of a first and a second pressure of the process

fluid such that the first and the second capacitance signals may be subtracted to calculate a differential capacitance representative of a differential pressure (col. 6, lines 57-61). Wiklund et al. fail, however, to disclose a wireless transceiver mounted to the conduit and connected with the first and second pressure sensors for wireless transmission of the differential pressure to a control system.

Sabata et al. disclose a wireless transceiver (paragraph 26) mounted to the inner wall of a conduit (paragraph 26 and Fig. 1) for the wireless transmission of a pressure signal to a control system (paragraph 25 and abstract).

It would have been obvious to one of ordinary skill in the art to include the wireless transceiver of Sabata et al. in the flow meter of Wiklund et al. in order to enable remote monitoring of the flow in the pipe which may be very long, or inaccessible, such as buried for example.

Claim 33 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Pat. No. 6,725,731 to Wiklund et al. in view of U.S. Pat. No. 6,536,287 to Beekhuizen et al.

Wiklund et al. disclose a flow meter adapted to measure a pressure and a flow direction of a process fluid within a conduit the flow meter comprising a first capacitive pressure sensor adapted to generate a first capacitance signal (capacitance-based pressure sensor 102A, Fig. 10) a second capacitive pressure sensor adapted to generate a second capacitance signal (capacitance-based pressure sensor 102B, Fig. 10) and a flow restrictive element positioned within the conduit and between the first and the second capacitive pressure sensors and adapted to cause a pressure drop in the conduit (restrictive member 20, Fig. 10 and col. 3, lines 18-21) wherein the first and the second capacitance signals are representative of a first and a second pressure of the process

fluid such that the first and the second capacitance signals may be subtracted to calculate a differential capacitance representative of a differential pressure (col. 6, lines 57-61). Wiklund et al. further disclose a temperature sensor to measure the temperature of a device, and to generate a signal indicative of the temperature of the device (col. 5, lines 41-49). Wiklund et al. fail, however, to disclose a temperature sensor embedded within an insulator of the first capacitive pressure sensor.

Beekhuizen et al. disclose a temperature sensor embedded within an insulator of a capacitive pressure sensor (thermistor 176 included in support member 110, Fig. 1 and support member 110 is an insulator, col. 2 lines 62-67).

It would have been obvious to one of ordinary skill in the art to use the temperature sensor of Beekhuizen et al. included with the insulator of the pressure sensor of Wiklund et al. in order to decrease the size of the sensor combination as well as to simplify the construction process by eliminating the need to install the pressure sensor and the temperature sensor independently.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. U.S. Pat. Nos. 5,505,092; 6,393,919; 6,502,467; 6,619,141; 6,725,731; 6,813,964; 6,843,139; 6,910,388 and Published U.S. Application No. 2004/0107762 disclose various forms of pressure sensors and flow sensors.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to George P. Bonanto whose telephone number is (571) 272-2182. The examiner can normally be reached on M-F 8-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David M. Gray can be reached on (571) 272-2119. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

David Gray
Primary Examiner

GPB